FYI
DHEC's Office of Solid Waste Reduction and Recycling
For Your Information...

Landfill 102: How Landfills Work

You know what a landfill is. That's where your garbage goes, right? That's true. But just what is a landfill?

In general terms, a landfill is a large area of land specially designed and built to hold different types of waste. There are different kinds of landfills that accept specific kinds of waste including hazardous waste, industrial waste, construction and demolition debris and land-clearing debris.

Which leads us to municipal solid waste landfills (MSW). This is where your everyday garbage goes. (For the specific definition of MSW and the total amounts and types of MSW we make, see "FYI: Garbage 101 Fact Sheet.")

A landfill is not a dump.

In the past, there were few or no regulations regarding landfills. It showed. Many people remember open dumps that smelled and often contaminated groundwater.

It's different today. MSW landfills are well-engineered facilities that in their location, design, operation and closing must meet strict U.S. Environmental Protection Agency and S.C. Department of Health and Environmental Control (DHEC) regulations set up to protect human health and the environment. In South Carolina, all MSW landfills must be approved (receive a permit) by DHEC.

To begin with, MSW landfills must be built in suitable geological areas where clay deposits and other land features act as natural buffers between the landfill and the surrounding environment.

MSW landfills cannot be built near faults, wetlands, floodplains and other restricted areas. They cannot be built within certain distances of homes, schools, hospitals and recreational parks. They cannot be built within certain distances of airports. Why? MSW landfills attract birds and birds can make airplanes crash.

Protecting the Environment

The purpose of a MSW landfill – and its biggest challenge – is to hold waste so that the waste does not harm the environment. Given that, if there is one theme of MSW landfill design and operation it is this: protecting water.

The design and operation of MSW landfills includes using durable, puncture-resistant plastic liners and other materials such as clay to prevent groundwater contamination. The bottom liner is placed at the bottom of the landfill to prevent waste from coming in contact with outside soil and the groundwater.

The design and operation of MSW landfills includes a storm water collection system. This system is designed to collect water (from rain) that does not come in contact with waste. Storm water does not have to be treated (cleaned).

The design and operation of MSW landfills includes a leachate collection system. This system is designed to collect water (mostly from rain but also liquids that are part of the waste) that comes in contact with waste. As this water works it way through the waste (much like water working its way through coffee grounds in a coffee maker), it picks up contaminants. This water is called leachate and it must be collected so it does not contaminate groundwater.

Clay and plastic liners on the sides and the bottom of the MSW landfill are to prevent leachate from escaping and polluting the soil.

A network of pipes and drains (leachate collection system) collects the leachate and pumps it to the surface where it is stored in a collection tank. This water is cleaned on site or sent to wastewater treatment facility where it is cleaned.

The design and operation of MSW landfills includes groundwater- and gas-monitoring wells. These wells are placed in specific areas and tested periodically to see if any of the nearby groundwater is contaminated.

The design and operation of MSW landfills also includes a gas collection system. Landfill gas, which includes methane, is produced as waste breaks down in a landfill. It is collected as a safety measure and often is used to make energy. (See "Energy from Landfills" For Your Information fact sheet.

Just how does a MSW landfill work?

The daily operation at a MSW landfill includes the disposing of waste into a specific area of the landfill called a cell, the compaction (crushing) of the waste and the covering of the waste with a soil layer.

Waste is disposed of into an open area of the landfill called a cell. Think of a cell as a small football stadium – it has a flat floor (the football field) and slopes built all around it (seating). MSW landfills almost always just have one cell open to accept waste. This cell or area is called the working face. At the same time another cell is being built so it is ready when the other cell is full.

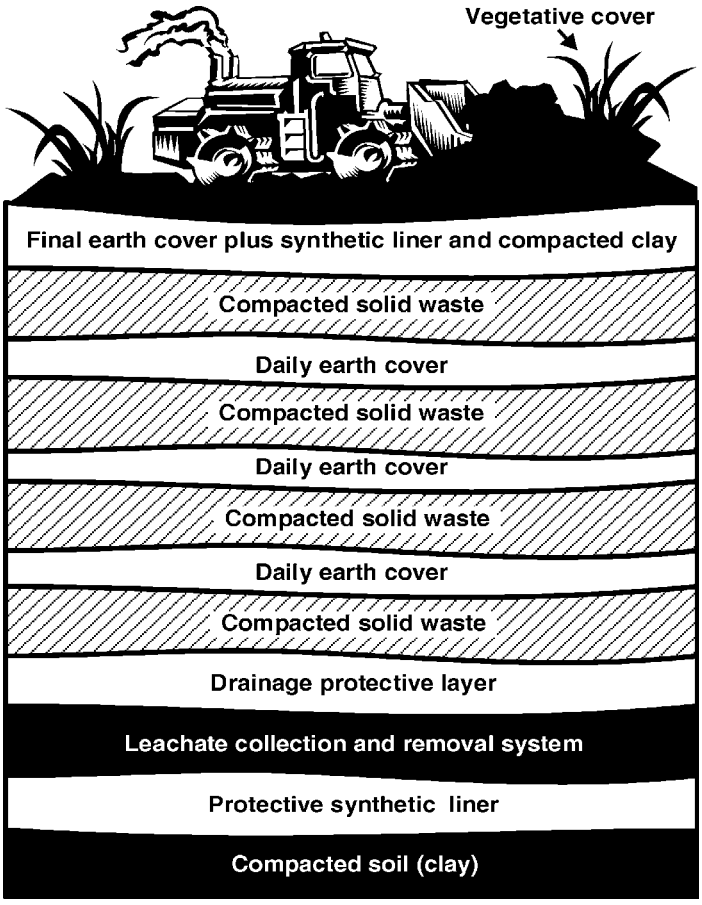
MSW is compacted to save space. Space is money at a landfill. Did you know that on average about 1,200 pounds of waste can be compacted into one cubic yard of space?

At the end of the day, the working part of the cell is covered with a layer of soil to minimize odors, pests and blowing litter. This is called the daily cover. This three-step process is repeated over and over again until the cell is filled. The waste can be piled to a certain height based on the permit.

When a MSW landfill is full, it is closed with a final cover that includes a synthetic cap and soil layer.

Once the MSW landfill is closed, the responsibility of the landfill operator does not end. Operators must continue to pump the leachate, test the groundwater wells, inspect the cap and repair any erosion, fill low areas due to settlement, maintain vegetation and prevent trees from growing. In addition, operators must set aside funding (financial assurance) to close the landfill and provide post-closure care in the event the operator abandons the site.

For more information about landfills, see "FYI: Landfill 101 Fact Sheet." For more information about recycling and other waste management issues, please call DHEC's Office of Solid Waste Reduction and Recycling at **1-800-768-7348** or visit **www.scdhec.gov/recycle**.



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